What is claimed is:

1. A method of determining a defect-free or defect semiconductor integrated circuit, comprising:

a first measurement step for measuring a quiescent power supply current (QPSC) of a first semiconductor integrated circuit (IC), a plurality of times in a predetermined interval after stop of the operation of the first IC;

a first data calculation step for calculating a first feature data indicating a feature(s) of the measured QPSCs of the first IC;

a second measurement step for measuring a QPSC of a second semiconductor IC, a plurality of times in the same condition to that of the first IC after stop of the operation of the second IC;

a second data calculation step for calculating a second feature data indicating a feature(s) of the measured QPSCs of the second IC; and

a comparison and determination step for comparing a resemble between the first feature data and the second feature data, and determining the first and second ICs as defect-free ICs when the resemble is high or the first and second ICs as defect ICs when the resemble is low.

2. A method according to claim 1, wherein the

first and second ICs are formed on the same semiconductor wafer.

3. A method according to claim 2, wherein the IC comprises a complementary metal oxide semiconductor (CMOS) IC.

4. A method according to claim 1, wherein

one of the first and second ICs is decided as a reference IC,

the second measurement step and the second calculation step are carried out for other semiconductor IC as the second IC,

in the comparison and determination step, the second IC is determined as a defect-free IC when the resemble is high, or as a defect IC when the resemble is low.

5. A method according to claim 1, wherein

in the first data calculation step, a first average QPSC of the measured QPSCs of the first IC and a first plurality of QPSC deviations of the measured QPSCs of the first IC which are (the measured QPSCs of the first IC - the first average) are calculated,

in the second data calculation step, a second average QPSC of the measured QPSCs of the second IC and a second plurality of QPSC deviations of the measured QPSCs of the second IC which are (the measured QPSCs of the

second IC - the second average) are calculated, and

the method further comprising a third data calculation step for performing a first regression analysis on the first plurality of QPSC deviations and the second plurality of QPSC deviations to produce a first regression line and calculating a gradient of the first regression line, performing a second regression analysis on the measured QPSCs of the first IC to produce a second regression line and calculating a predicted QPSC, and calculating a decision coefficient defined by the following formula, and

$$1-\frac{\sum\left(measured\ QPSCs\ of\ the\ \sec ond\ IC-predected\ QPSC\right)^2}{\sum\left(\sec ond\ deviation\right)^2}$$

wherein, in the comparison and determination step, the first and second ICs are resemble when the decision coefficient is greater than a limit value, and the deviation of the gradient and the ratio is in a predetermined range.

6. A method according to claim 1, wherein

in the first data calculation step, a first average QPSC of the measured QPSCs of the first IC, a first standard deviation of the measured QPSCs of the first IC, and first normalized values defined as (the measures QPSCs of the first IC - the first average)/the

first standard deviation are calculated, and

in the second data calculation step, a second average of the measured QPSCs of the second IC, a second standard deviation of the measured QPSCs of the first IC, and second normalized values defined as (the measures QPSCs of the second IC - the second average)/the second standard deviation are calculated,

the method further comprising a third data calculation step for performing a first regression analysis on the first plurality of normalized values and the second plurality of normalized values to produce a first regression line and calculating a gradient of the first regression line, performing a second regression analysis on the first normalized values to produce a second regression line and calculating a predicted normalized value, calculating an average normalized value of the second plurality of normalized values, and calculating a decision coefficient defined by the following formula, and

$$1-\frac{\sum(\sec ond\ s\tan dard\ values - predected\ s\tan dard\ value)^2}{\sum(\sec ond\ s\tan dard\ values - average\ s\tan dard\ value)^2}$$

wherein, in the comparison and determination step, the first and second ICs are resemble when the decision coefficient is greater than a limit value, and

the gradient is in a predetermined range.

7. A method according to claim 1, wherein

in the first data calculation step, a first average QPSC of the measured QPSCs of the first IC, a first standard deviation of the measured QPSCs of the first IC, and a first feature value defined by (the first average QPSC / the first standard deviation) are calculated,

in the second data calculation step, a second average QPSC of the measured QPSCs of the second IC, a second standard deviation of the measured QPSCs of the second IC, and a second feature value defined by (the second average QPSC / the second standard deviation) are calculated, and

in the comparison and determination step, the first and second ICs are resemble when the first and second feature values are in a predetermined range.

8. A method according to claim 1, wherein

in the first data calculation step, a first average QPSC of the measured QPSCs of the first IC, first QPSC deviations which are (the measured QPSCs of the first IC - the first average QPSC), and first feature values defined by (the first QPSC deviations / the first QPSC average) are calculated,

in the second data calculation step, a second

average QPSC of the measured QPSCs of the second IC, second QPSC deviations which are the measured QPSCs of the second IC - the second average QPSC, and second feature values defined by (the second QPSC deviations / the second QPSC) are calculated,

in the comparison and determination step, the first and second ICs are resemble when the first and second feature data are in a predetermined range.

9. A method of determining a defect-free or defect semiconductor integrated circuit, comprising:

a first measurement step for measuring each quiescent power supply current (QPSC) of each of a plurality of reference semiconductor integrated circuits (ICs), a plurality of times in a predetermined interval after stop of the operation of the first IC;

a first data calculation step for calculating each first QPSC average of measured QPSCs of each reference IC, each first standard deviation of the measured QPSCs of each reference IC, each of first normalized values defined by ((the measured QPSCs - the corresponding first QPSC average) / the corresponding first standard deviation), each of first average normalized value of each of first normalized values, each of first feature value defined by ((each of the measured QPSCs - the corresponding each first QPSC average) - (the

corresponding each first normalized values / the corresponding each first standard deviation)), and the maximum feature value among the first feature values;

a second measurement step for measuring a QPSC of a test IC a plurality of times in the same conditions to the reference ICs after stop of the operation of the test IC;

a second data calculation step for calculating a second QPSC average of measured QPSCs of the test IC, a second standard deviation of the measured QPSCs of the test IC, second normalized values defined by ((the measured QPSCs of the test IC - the second QPSC average) / the second standard deviation), a second average normalized value of the second normalized values, and second feature values defined by ((the measured QPSCs of the test IC - the second average QPSC) - (the second normalized values / the second standard deviation));

a comparison and determination step for comparing the second feature value and the maximum feature value and determining the test IC as a defect-free IC when the second feature values is smaller than the maximum feature value or a defect IC when one of the second feature values exceeds the maximum feature value.

10. A method of determining a defect-free or defect semiconductor integrated circuit, comprising:

a first measurement step for measuring a quiescent power supply current (QPSC) of a reference semiconductor integrated circuit (IC), a plurality of times in a predetermined interval after stop of the operation of the reference IC;

a first data calculation step for calculating a first standard deviation of measured QPSCs of the reference IC;

a second measurement step for measuring a QPSC of a test IC a plurality of times in the same condition of that of the reference IC after stop of the operation of the test IC;

a second data calculation step for calculating a QPSC average and a second standard deviation of measured QPSCs of the test IC, and

a comparison and determination step for comparing a parameter which is ((QPSC average - (the second standard deviation / the first standard deviation)) and a limit and determining the test IC as a defect-free IC when the parameter is smaller than the limit or the test IC as a defect IC when the parameter is equal or greater than the limit.

11. A method of determining a defect-free or defect semiconductor integrated circuit, comprising:

a first measurement step for measuring each

quiescent power supply current (QPSC) of each of a plurality of reference semiconductor integrated circuits (ICs), a plurality of times in a predetermined interval after stop of the operation of the first IC;

a first data calculation step for calculating each first QPSC average of measured QPSCs of each reference IC, each first standard deviation of the measured QPSCs of each reference IC, and each of first coefficients defined by ((the measured QPSCs - the corresponding first QPSC average) / the corresponding first standard deviation);

a second measurement step for measuring a QPSC of a test IC a plurality of times in the same conditions to the reference ICs after stop of the operation of the test IC;

a second data calculation step for calculating a first QPSC average of measured QPSCs of the test IC, and second deviations defined by (the measured QPSCs of the test IC - the first QPSC average);

a third data calculation step for performing regression analysis on the first coefficients and the second deviations to produce a regression analysis, calculating a predicted coefficient from the regression line and a gradient of the regression line, and calculating a decision coefficient by the following

formula, and

$$1-\frac{\sum(\text{the first coefficients}-\text{the predected coefficient})^2}{\sum(\text{the second deviations})^2}$$

a comparison and determination step for comparing the test IC as a defect-free IC when the decision coefficient is greater than a limit and (the gradient / the second deviations) are in a predetermined range.

12. A method of determining a defect-free or defect semiconductor integrated circuit, comprising:

a first measurement step for measuring each quiescent power supply current (QPSC) of each of a plurality of reference semiconductor integrated circuits (ICs), a plurality of times in a predetermined interval after stop of the operation of the first IC;

a first data calculation step for calculating each first QPSC average of measured QPSCs of each reference IC, each first standard deviation of the measured QPSCs of each reference IC, each of first normalized values defined by ((the measured QPSCs - the corresponding first QPSC average) / the corresponding first standard deviation), each of first average normalized value of each of first normalized values, and each of first feature value defined by ((each of the

measured QPSCs - the corresponding each first QPSC average) - (the corresponding each first normalized values / the corresponding each first standard deviation));

a second measurement step for measuring a QPSC of a test IC a plurality of times in the same conditions to the reference ICs after stop of the operation of the test IC;

a second data calculation step for calculating a second QPSC average of measured QPSCs of the test IC, a second standard deviation of the measured QPSCs of the test IC, second normalized values defined by ((the measured QPSCs of the test IC - the second QPSC average) / the second standard deviation)), and second normalized value deviation defined as (the second normalized values - the average normalized values);

a third data calculation step for performing regression analysis on the first coefficients and the second deviations to produce a regression analysis, calculating a predicted feature value from the regression line and a gradient of the regression line, and calculating a decision coefficient by the following formula, and

$$1-\frac{\sum(\text{the first feature values} - \text{the predected feature value})^2}{\sum(\text{the second standard values} - \text{an average of the second standard value})^2}$$

a comparison and determination step for determining the test IC as a defect-free IC when the decision coefficient is greater than a limit and the gradient is in a predetermined range.

13. An apparatus for determining a defect-free or defect semiconductor integrated circuit, comprising:

a first measurement means for measuring a quiescent power supply current (QPSC) of a first semiconductor integrated circuit (IC), a plurality of times in a predetermined interval after stop of the operation of the first IC;

a first data calculation means for calculating a first feature data indicating a feature(s) of the measured QPSCs of the first IC;

a second measurement means for measuring a QPSC of a second semiconductor IC, a plurality of times in the same condition to that of the first IC after stop of the operation of the second IC;

a second data calculation means for calculating a second feature data indicating a feature(s) of the measured QPSCs of the second IC; and

a comparison and determination means for comparing a resemble between the first feature data and the second feature data, and determining the first and second ICs as defect-free ICs when the resemble is high

or the first and second ICs as defect ICs when the resemble is low.

14. An apparatus according to claim 13, wherein the first and second ICs are formed on the same semiconductor wafer.

15. An apparatus according to claim 14, wherein the IC comprises a complementary metal oxide semiconductor (CMOS) IC.

16. An apparatus according to claim 13, wherein

one of the first and second ICs is decided as a reference IC,

the second measurement means and the second calculation means operate for other semiconductor IC as the second IC,

the comparison and determination means determines the second IC as a defect-free IC when the resemble is high, or as a defect IC when the resemble is low.

17. An apparatus according to claim 13, wherein

the first data calculation means calculates a first average QPSC of the measured QPSCs of the first IC and a first plurality of QPSC deviations of the measured QPSCs of the first IC which are defined (the measured QPSCs of the first IC - the first average), and

the second data calculation means calculates a

second average QPSC of the measured QPSCs of the second IC and second plurality of QPSC deviations of the measured QPSCs of the second IC which are defined as (the measured QPSCs of the second IC - the second average),

the apparatus further comprising a third data calculation means for performing a first regression analysis on the first plurality of QPSC deviations and the second plurality of QPSC deviations to produce a first regression line and calculating a gradient of the first regression line, performing a second regression analysis on the measured QPSCs of the first IC to produce a second regression line and calculating a predicted QPSC, and calculating a decision coefficient defined by the following formula, and

$$1-\frac{\sum(\textit{measured QPSCs of the second IC} - \textit{predected QPSC})^2}{\sum(\textit{second deviation})^2}$$

wherein, the comparison and determination means comprises the first and second ICs and decides the both resemble when the decision coefficient is greater than a limit value, and the deviation of the gradient and the ratio is in a predetermined range.

18. An apparatus according to claim 13, wherein

the first data calculation means calculates a first average QPSC of the measured QPSCs of the first IC,

a first standard deviation of the measured QPSCs of the first IC, and first normalized values defined as (the measures QPSCs of the first IC - the first average)/the first standard deviation, and

the second data calculation means calculates a second average of the measured QPSCs of the second IC, a second standard deviation of the measured QPSCs of the first IC, and second normalized values defined as (the measures QPSCs of the second IC - the second average)/the second standard deviation,

the apparatus further comprising a third data calculation means for performing a first regression analysis on the first plurality of normalized values and the second plurality of normalized values to produce a first regression line and calculating a gradient of the first regression line, performing a second regression analysis on the first normalized values to produce a second regression line and calculating a predicted normalized value, calculating an average normalized value of the second plurality of normalized values, and calculating a decision coefficient defined by the following formula, and

$$1-\frac{\sum(\text{second standard values} - \text{predected standard value})^2}{\sum(\text{second standard values} - \text{average standard value})^2}$$

wherein, the comparison and determination means compares the first and second ICs and decides the both resemble when the decision coefficient is greater than a limit value, and the gradient is in a predetermined range.

19. An apparatus according to claim 13, wherein

the first data calculation means calculates a first average QPSC of the measured QPSCs of the first IC, a first standard deviation of the measured QPSCs of the first IC, and a first feature value defined by (the first average QPSC / the first standard deviation),

the second data calculation means calculates a second average QPSC of the measured QPSCs of the second IC, a second standard deviation of the measured QPSCs of the second IC, and a second feature value defined by (the second average QPSC / the second standard deviation), and

the comparison and determination means compares the first and second ICs and decides the both resemble when the first and second feature values are in a predetermined range.

20. An apparatus according to claim 13, wherein

the first data calculation means calculates a first average QPSC of the measured QPSCs of the first IC, first QPSC deviations which are (the measured QPSCs of the first IC - the first average QPSC), and first feature

values defined by (the first QPSC deviations / the first QPSC average),

the second data calculation means calculates a second average QPSC of the measured QPSCs of the second IC, second QPSC deviations which are the measured QPSCs of the second IC - the second average QPSC, and second feature values defined by (the second QPSC deviations / the second QPSC), and

the comparison and determination means compares the first and second ICs and decides the both resemble when the first and second feature data are in a predetermined range.

21. An apparatus for determining a defect-free or defect semiconductor integrated circuit, comprising:

a first measurement means for measuring each quiescent power supply current (QPSC) of each of a plurality of reference semiconductor integrated circuits (ICs), a plurality of times in a predetermined interval after stop of the operation of the first IC;

a first data calculation means for calculating each first QPSC average of measured QPSCs of each reference IC, each first standard deviation of the measured QPSCs of each reference IC, each of first normalized values defined by ((the measured QPSCs - the corresponding first QPSC average) / the corresponding

first standard deviation), each of first average normalized value of each of first normalized values, each of first feature value defined by ((each of the measured QPSCs - the corresponding each first QPSC average) - (the corresponding each first normalized values / the corresponding each first standard deviation)), and the maximum feature value among the first feature values;

a second measurement means for measuring a QPSC of a test IC a plurality of times in the same conditions to the reference ICs after stop of the operation of the test IC;

a second data calculation means for calculating a second QPSC average of measured QPSCs of the test IC, a second standard deviation of the measured QPSCs of the test IC, second normalized values defined by ((the measured QPSCs of the test IC - the second QPSC average) / the second standard deviation), a second average normalized value of the second normalized values, and second feature values defined by ((the measured QPSCs of the test IC - the second average QPSC) - (the second normalized values / the second standard deviation)); and

a comparison and determination means for comparing the second feature value and the maximum feature value and determining the test IC as a defect-free IC when the second feature values is smaller than

the maximum feature value or a defect IC when one of the second feature values exceeds the maximum feature value.

22. An apparatus for determining a defect-free or defect semiconductor integrated circuit, comprising:

a first measurement means for measuring a quiescent power supply current (QPSC) of a reference semiconductor integrated circuit (IC), a plurality of times in a predetermined interval after stop of the operation of the reference IC;

a first data calculation means for calculating a first standard deviation of measured QPSCs of the reference IC;

a second measurement means for measuring a QPSC of a test IC a plurality of times in the same condition of that of the reference IC after stop of the operation of the test IC;

a second data calculation means for calculating a QPSC average and a second standard deviation of measured QPSCs of the test IC, and

a comparison and determination means for comparing a parameter which is ((QPSC average - (the second standard deviation / the first standard deviation)) and a limit and determining the test IC as a defect-free IC when the parameter is smaller than the limit or the test IC as a defect IC when the parameter is

equal or greater than the limit.

23. An apparatus for determining a defect-free or defect semiconductor integrated circuit, comprising:

a first measurement means for measuring each quiescent power supply current (QPSC) of each of a plurality of reference semiconductor integrated circuits (ICs), a plurality of times in a predetermined interval after stop of the operation of the first IC;

a first data calculation means for calculating each first QPSC average of measured QPSCs of each reference IC, each first standard deviation of the measured QPSCs of each reference IC, and each of first coefficients defined by ((the measured QPSCs - the corresponding first QPSC average) / the corresponding first standard deviation);

a second measurement means for measuring a QPSC of a test IC a plurality of times in the same conditions to the reference ICs after stop of the operation of the test IC;

a second data calculation means for calculating a first QPSC average of measured QPSCs of the test IC, and second deviations defined by (the measured QPSCs of the test IC - the first QPSC average);

a third data calculation means for performing regression analysis on the first coefficients and the

second deviations to produce a regression analysis, calculating a predicted coefficient from the regression line and a gradient of the regression line, and calculating a decision coefficient by the following formula, and

$$1 - \frac{\sum \left(\textit{the first coefficients} - \textit{the predected coefficient}\right)^2}{\sum \left(\textit{the second deviations}\right)^2}$$

a comparison and determination means for comparing the test IC as a defect-free IC when the decision coefficient is greater than a limit and (the gradient / the second deviations) are in a predetermined range.

24. An apparatus for determining a defect-free or defect semiconductor integrated circuit, comprising:

a first measurement means for measuring each quiescent power supply current (QPSC) of each of a plurality of reference semiconductor integrated circuits (ICs), a plurality of times in a predetermined interval after stop of the operation of the first IC;

a first data calculation means for calculating each first QPSC average of measured QPSCs of each reference IC, each first standard deviation of the measured QPSCs of each reference IC, each of first normalized values defined by ((the measured QPSCs - the

corresponding first QPSC average) / the corresponding first standard deviation), each of first average normalized value of each of first normalized values, and each of first feature value defined by ((each of the measured QPSCs - the corresponding each first QPSC average) - (the corresponding each first normalized values / the corresponding each first standard deviation));

a second measurement means for measuring a QPSC of a test IC a plurality of times in the same conditions to the reference ICs after stop of the operation of the test IC;

a second data calculation means for calculating a second QPSC average of measured QPSCs of the test IC, a second standard deviation of the measured QPSCs of the test IC, second normalized values defined by ((the measured QPSCs of the test IC - the second QPSC average) / the second standard deviation)), and second normalized value deviation defined as (the second normalized values - the average normalized values);

a third data calculation means for performing regression analysis on the first coefficients and the second deviations to produce a regression analysis, calculating a predicted feature value from the regression line and a gradient of the regression line, and

calculating a decision coefficient by the following formula, and

$$1-\frac{\sum\left(\text{the first feature values} - \text{the predected feature value}\right)^{2}}{\sum\left(\text{the second standard values} - \text{an average of the second standard value}\right)^{2}}$$

a comparison and determination means for determining the test IC as a defect-free IC when the decision coefficient is greater than a limit and the gradient is in a predetermined range.